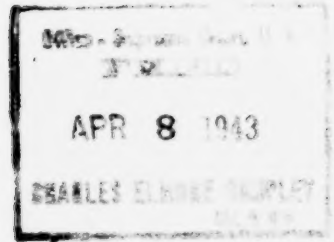


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No. 373

In the Supreme Court of the United States

OCTOBER TERM, 1942

THE UNITED STATES, PETITIONER
v.
MARCONI WIRELESS TELEGRAPH COMPANY
OF AMERICA

ON WRIT OF CERTIORARI TO THE COURT OF CLAIMS

BRIEF FOR THE UNITED STATES

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OPINIONS BELOW

The opinion of the Court of Claims on the issues of validity and infringement of the patent in suit (I R. 7-116)¹ is reported at 81 C. Cls. 671; its opinion in the accounting proceedings (I R. 117-182) is not yet officially reported.

JURISDICTION

The interlocutory judgment of the Court of Claims concerning validity and infringement pur-

¹ The record citations refer to the volume and page.

suant to which an accounting was held, was rendered November 4, 1935 (I R. 75); the final judgment, after the accounting proceedings, was rendered April 6, 1942 (I R. 182). The petition for a writ of certiorari was filed on September 3, 1942, (III R. 2524), pursuant to an extension of time granted by the Chief Justice (III R. 2523), and was granted on December 14, 1942. The jurisdiction of this Court is invoked under Section 3 (b) of the Act of February 13, 1925, as amended.

QUESTIONS PRESENTED

(1) Whether claim 16 of Marconi patent No. 763,772 was infringed by the United States.

(2) Whether claim 16 of the Marconi patent, if infringed, was valid, or whether it was void for anticipation in the prior art.

(3) A question subsidiary to these two questions is whether the Court of Claims erred in refusing to consider evidence, introduced in the accounting proceedings, material to the issues of validity and infringement.

(4) Whether, even if the claim was valid and was infringed by the United States, the court below properly adopted as a measure of compensation the value of the principal advantage attained by the arrangement used by the Government, in the absence of any finding or any evidence to support a finding that such advantage

was disclosed or attained by Marconi's arrangement.

STATUTE INVOLVED

The Appendix, *infra*, pp. 51-52, contains the pertinent provisions of the Act of June 25, 1910, c. 423, 36 Stat. 851, as amended by the Act of July 1, 1918, c. 114, 40 Stat. 704 (35 U. S. C. § 68), and the pertinent provisions of Section 3 (b) of the Act of February 13, 1925, c. 229, 43 Stat. 936, 939, as amended by the Act of May 22, 1939, c. 140, 53 Stat. 752 (28 U. S. C. § 288b).

STATEMENT

On July 29, 1916, respondent Marconi Wireless Telegraph Company of America (herein called plaintiff) brought this suit in the Court of Claims under the Act of June 25, 1910, to recover compensation for the allegedly unauthorized use by the United States (herein sometimes called defendant) of inventions alleged to have been covered by four patents, two issued to Guglielmo Marconi, one to Sir Oliver Lodge, and one to Sir John Ambrose Fleming.

The court below held that one Marconi patent, reissue No. 11,913 was not infringed, and that the Lodge patent No. 609,154 was valid and infringed.² As to these, no review has been sought by either party.

²The final judgment rendered after the accounting proceedings awarded plaintiff \$34,827.70 plus interest for infringement of the Lodge patent. This award is not here involved.

The court below further held that the Fleming patent No. 803,684 had not been infringed and that all the claims in suit (except claim 16) of the other Marconi patent, No. 763,772, were invalid (I R. 75,117). This ruling concerning the Fleming patent and the invalidity of the Marconi patent is now before this Court in *Marconi Wireless Telegraph Company of America v. The United States*, No. 369, this Term.

In respect of claim 16 of the Marconi patent, No. 763,772, the court below rendered an interlocutory judgment on November 4, 1935, holding it valid and infringed, and after accounting proceedings, rendered its final judgment (I R. 182), on April 6, 1942, awarding compensation to plaintiff in the amount of \$42,984.93 plus interest for such infringement. The decision concerning claim 16 of the Marconi patent is the subject of this proceeding.

Marconi patent No. 763,772 was granted to Guglielmo Marconi on June 28, 1904, and related to wireless transmitting and receiving apparatus. It disclosed an arrangement claimed to provide a stronger transmitted signal and a more selective reception than had been attained prior to Marconi's disclosure (Finding XLI; I R. 37).³ Claim

³ Findings identified by roman numerals were made by the Court of Claims in connection with its interlocutory judgment of November 4, 1935; findings identified by arabic numerals were made by the Court of Claims after accounting proceedings, and in connection with its final judgment of April 6, 1942.

16 of this patent relates to an alleged improvement in receiving apparatus only (Finding XL; I R. 32; cf. I R. 174, 180).

The earlier receiver claimed to have been improved by Marconi consisted of two circuits: the antenna-circuit and the detector-circuit. The antenna-circuit, which received the transmitted oscillations (signals), had an antenna at one end and a connection to earth at the other; the detector-circuit was coupled to the antenna-circuit through a transformer, and included devices for detecting and translating the signals transmitted (Fig. 13 of Lodge patent, Ex. 20, I R. 26; Finding XXVII; I R. 24). Marconi's alleged invention required, in the receiver, a variably tuned antenna-circuit inductively coupled through an oscillation transformer to a tuned closed oscillating-circuit. The invention also required two similar circuits (antenna circuit and closed circuit) in the transmitter, and the patent specified that each of the four circuits in the transmitter and receiver should be tuned to the same frequency in order to secure the desired objects of strong signals and of selective reception. (See Finding XXXVIII; I R. 31.)

The patent included twenty claims, of which fifteen were involved in the suit below.⁴ Of these, seven claims, including claim 16,⁵ were directed to the receiver alone; they claimed tuning the two circuits at the receiver (i. e., the antenna or open

⁴ Claims 1, 2, 3, 6, 8, 10, 11, 12, 13, 14, 16, 17, 18, 19, and 20.

⁵ Claims 2, 13, 14, 16, 17, 18, and 19.

circuit, and the detecting-circuit) to the same frequency (Finding XL; I R. 32).

The Court of Claims held that six of these seven claims were anticipated by the prior work of John Stone Stone (Findings LVII and LVIII; I R. 56-57), but held claim 16 valid and infringed (I R. 75).

SUMMARY OF ARGUMENT

I

The finding of the court below that the Government's receivers infringed claim 16 of the Marconi patent is unsupported by substantial evidence. The distinctive feature of the claim which the court below held saved it from invalidation by the prior art was not shown nor found to be present in the Government's receivers; on the contrary, the record requires the conclusion that the condenser arrangement used by the Government—the device alleged to infringe—differed substantially in association, operation, and result from the arrangement disclosed in claim 16. Moreover, the court made no findings of fact as to these criteria of infringement to sustain its ultimate finding of infringement.

II

If, however, claim 16 is to be so broadly construed as to lead to the conclusion that it was infringed by the Government's condenser arrangement, the claim is invalid because the Government's arrangement was specifically disclosed in the art prior to

Marconi, namely, in the earlier patents of Pupin and Fessenden. The record requires the finding and conclusion that the structure, mode of operation, and result of the Government's arrangement are the same as those disclosed by Pupin and Fessenden; and consequently that claim 16, if it also relates to that arrangement, was void for anticipation in the prior art.

III

The error in the conclusions of the court below that claim 16 of the Marconi patent was valid and infringed was revealed in the record on the first hearing prior to the interlocutory judgment of November 4, 1935; it was further apparent from the absence of evidentiary findings as to substantial identity of arrangement, operation, and result necessary to sustain the conclusion of infringement. The record on the accounting proceeding which followed the interlocutory judgment served to emphasize that claim 16 was either invalid or not infringed. The evidence, necessarily introduced in the accounting proceedings to show the proper apportionment of the value of the advantages of the Government's device between the contributions of Marconi and those of others, demonstrated that Marconi's device and the Government's structure had an entirely different arrangement, operation, and result; and further, that the advantages of the Government's de-

vice were derived not from the Marconi patent but from the prior art disclosures of Pupin and Fessenden. The court below erred in refusing to consider the evidence, introduced in the accounting proceedings, as to these matters.

IV

Even assuming the patent was valid and infringed, the court below erroneously measured the damages. The court correctly found that the Government's arrangement produced the advantages of increased wavelength and sensitivity in tuning and saving in space and weight. The court made no findings, however, and there was no evidence which would have sustained any findings, that such advantages had been contributed by the patented device of Marconi. It was therefore error for the court to adopt these advantages of the Government's receivers as the measure of compensation awarded to the plaintiff.

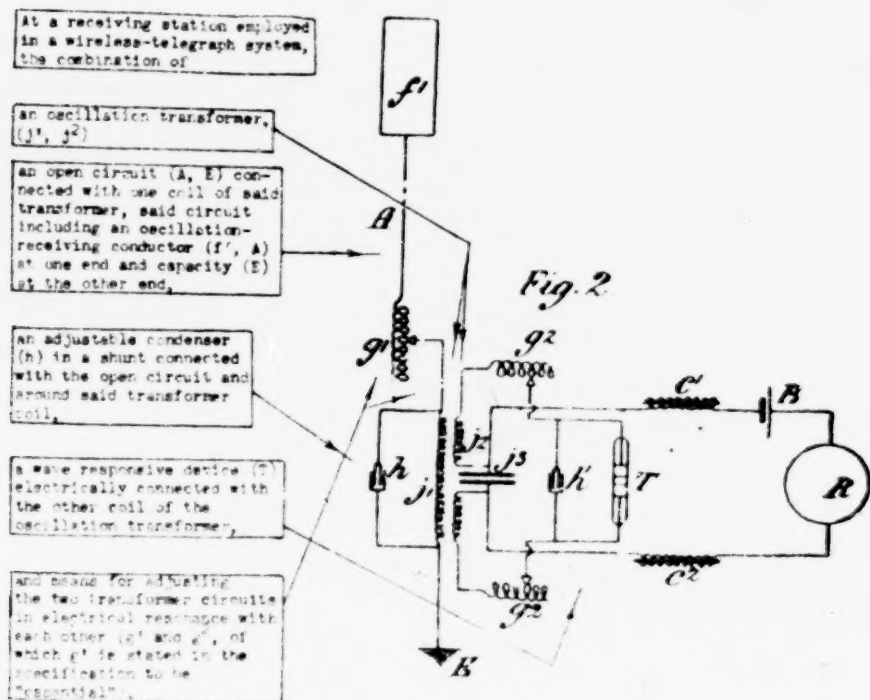
ARGUMENT

Marconi's claim 16 reads as follows (Ex. 21, IV R. 2596):

16. At a receiving-station employed in a wireless-telegraph system, the combination of an oscillation-transformer, an open circuit connected with one coil of said transformer, said circuit including an oscillation-receiving conductor at one end and capacity at the other end, *an adjustable condenser in a shunt connected with the*

open circuit and around said transformer-coil, a wave-responsive device electrically connected with the other coil of the oscillation-transformer, and means for adjusting the two transformer-circuits in electrical resonance with each other, substantially as described. [Italics added.]

The subject matter of this claim is shown as follows in Figure 2 of the Marconi patent, *h* being the "adjustable condenser", *f'*, *A*, *g'*—*E* being the "open circuit" (or antenna-circuit) and *j'* being the "transformer coil" (Ex. 21, IV R. 2590:



substantially as described.

Like the six other receiver claims which the court below held invalid for anticipation, claim 16 claimed means for tuning the two circuits at the receiver to the same frequency. Claim 16, however, was held to be distinguished from these other claims (and hence from the prior art) by its inclusion of the adjustable condenser *h* connected with the open circuit and in shunt with (i. e., forming a bypath around) the transformer coil *j'*. (See Marconi Figure 2, *supra*, p. 9; Finding LX; I R. 57; cf. I R. 174, 180.)

Since this is the distinctive feature of the claim which saves it from invalidation by the prior art, the question of infringement must turn upon whether or not the Government, in the allegedly infringing receivers, used its condenser in substantially the same association to operate in substantially the same way, and to produce substantially the same result, as the condenser in the arrangement disclosed by Marconi.

If any one of these three requisite elements of similarity is not found in the defendant's device, there can be no infringement.* The court made no specific findings on these three criteria of infringement; moreover, as we shall show in Point I, the evidence requires the conclusion that no one of these criteria was present in the Govern-

* *Westinghouse v. Boyden Power Brake Co.*, 170 U. S. 537, 569; *Ciniotti Unhairing Co. v. American Fur Refining Co.*, 198 U. S. 399, 414; *Holland Furniture Co. v. Perkins Glue Co.*, 277 U. S. 245, 257; *Sanitary Refrigerator Co. v. Winters*, 280 U. S. 30, 42; *Craftint Mfg. Co. v. Baker*, 94 F. (2d) 369, 373 (C. C. A. 9).

ment's use of its condenser, and hence that no infringement of claim 16 was shown. Consequently, the conclusion of the court below is clearly erroneous because unsupported by substantial evidence and because without subordinate findings of fact to sustain it (Act of May 22, 1939; see Appendix, p. 51, *infra*). Indeed, as we shall shew in Point II, if claim 16 is to be so broadly construed as to lead to the conclusion that there was infringement, the claim must necessarily be invalid, for the condenser arrangement used by the Government was specifically disclosed in the art prior to Marconi. This permits, in our view, only two alternatives: that claim 16 was not infringed, or that it is invalid. On either view, the decision below is erroneous. This error was emphasized at the accounting proceedings which followed the interlocutory judgment of validity and infringement; for it was there made clear that the association, operation and result of the Government's condenser arrangement were the same as those disclosed in the art prior to Marconi. The court below should therefore have rectified its prior ruling as to infringement, as requested by the Government prior to entry of final judgment (Point III).

But in any event, even assuming that the claim was valid and infringed, the measure of damages invoked by the court below was erroneous. The advantages which were shown to have been derived from the mode of operation of the Government's arrangement were adopted as the measure of compensation awarded to the plaintiff, although

there was no finding, nor any substantial evidence to support a finding, that such operation and advantages had been disclosed or attained by Marconi's arrangement. In Point IV, we shall show that the use of such advantages as the measure of recovery was therefore improper.

POINT I

The Government's receivers did not infringe Marconi's Claim 16

The record establishes that there are critical differences between claim 16 and the receivers used by defendant; these differences relate to the arrangement, the operation, and the result of the devices in controversy. The essential distinctions between claim 16 and the defendant's receivers negate the conclusion that defendant infringed the claim, and that conclusion is unsupported by substantial evidence.

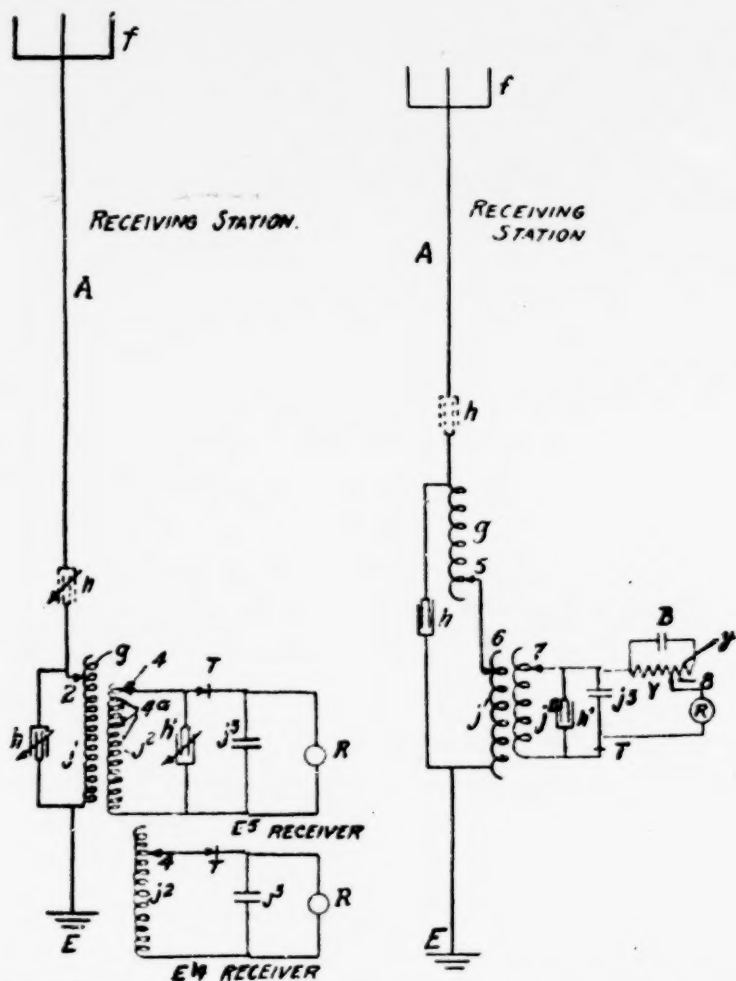
1. Arrangement

In the Marconi arrangement as disclosed in claim 16, the variable condenser *h* does *not bridge* the variable inductance tuning coil *g'* (see Figure 2, Marconi patent No. 763,772, *supra* p. 9); and this variable tuning coil is stated in the patent to be an *essential* element of Marconi's alleged invention.¹ In contrast, the variable condenser *h* used by the Government in the two types of receivers alleged to infringe claim 16 is invariably

¹ The text of the Marconi patent (p. 1, lines 56-59) states:

"The system also requires as essential elements thereof the inclusion in the lines (at both stations) from the aerial conductor to the earth of variable inductances * * *."

connected across *all* the inductance coils (j' and g) in the open circuit (f , A , E), as the following diagram will show:



The only variable inductance disclosed in the antenna circuit of the receiver is the tuning coil g' which is not bridged by the condenser h (Finding XXXVIII, I R. 31-32). In every instance in which the condenser h is present in the tables on page 4 of the Marconi specification, referred to by the court below in Finding LX, the "essential" unbridged coil g' is present.

This fact was indeed expressly found by the court below after the accounting.* Plainly, therefore, there is a basic distinction in arrangement between the receiver circuits covered by claim 16 and defendant's circuits.

2. Operation and result

The difference in arrangement of the circuits produces important differences in their operation and results which may be succinctly described as follows: In the Marconi arrangement, the presence of the condenser in *series* between the inductance coil g' and the earth E makes the condenser act in *series* with the antenna-to-earth capacity and tends to cause the primary tuned circuit to respond to *decreased* wave lengths;⁹ in the Government's structure, the presence of the condenser in *parallel* with *all* the inductance coils of the circuit places it in *parallel* with the an-

* Finding 23, I R. 139. This finding relates to the Government's condenser h in its *solid-line* position in the Figures above reproduced, which constituted part of Finding 23. The *dotted-line* position is an alternative arrangement of the condenser, not alleged to infringe claim 16 (Finding 23, I R. 139).

⁹ *Dow*, III R. 2364 (Q. 18), 2367; *Tuska*, III R. 2509, X QQ. 266, 268; *Wheeler*, III R. 2434 (Q. 55), 2436 (70 Q), 2451 (Q. 146); Def. Ex. BBB, V R. 4114; *Waterman*, I R. 357 (top), 358 (bottom); *Loftin*, II R. 977. The experts called by plaintiff to testify were Waterman, Tuska, and Pickard; those called by the Government were Loftin, Wheeler, Dow. (See quotations in n. 14, *infra*, p. 17.)

tenna-to-earth capacity and causes the primary tuned circuit to respond to *increased* wave lengths.¹⁰

Marconi's condenser arrangement has the advantage of shunting or bypassing most of the energy of the antenna circuit around the coupling coil j' , thus constituting a means for loosening the coupling between the antenna and secondary circuits. This is different from and possibly an improvement over other loose coupling means theretofore known to the art: the swamping inductances used by Stone (Findings LV and LVII, I R. 52, 56) and the physical separation of coils used by Lodge (Fig. 13, I R. 26; II R. 1018). But the Government does not use the Marconi bypass arrangement for loose coupling; it uses only the earlier alternatives of Stone and Lodge.

To explain the difference in operation and result, we shall advert first to certain accepted laws of radiotelegraphy.

(a) *General Principles*

An electrical circuit can be tuned to a given wave length only by the use of inductance and capacity *in series with each other*. For illustration we insert a diagram showing four forms of a tuned circuit:

¹⁰ *Pickard*, III R. 2328-2335; *Tuska*, III R. 2498, Q. 107.

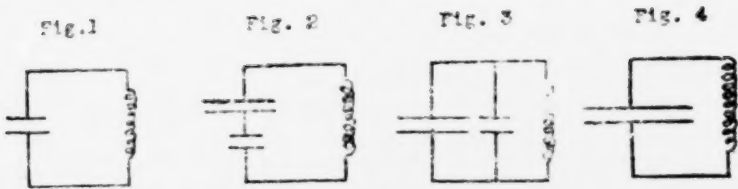


Figure 1 is the conventional tuned circuit containing inductance (the coil on the right) and capacity (the condenser, i. e., the parallel plates on the left) in series. Figure 2 shows two condensers in series with each other in the circuit, and sequentially in series with the inductance. In such case, the total capacity in the circuit is restricted to that of the smaller condenser, even if the larger condenser is so large as virtually to be a direct wire connection.¹¹ The third figure shows two condensers in parallel with each other in the circuit which is in series with the inductance. In that case, the total capacity equals the sum of the two capacities and the result is the same as if one larger condenser were used, as in the fourth figure. When these elementary concepts are applied to this case, it will be seen that Marconi's arrangement is the same and functions in the same way as the circuit in Figure 2, while the Government's arrangement is that of Figure 3.

(b) *Marconi's Circuit*

As the court below found (Finding XXXVI, I R. 30), in the open antenna-circuit connected at one end to an aerial wire and at the other end to the earth, the elevated wire and the surface of the

¹¹ Waterman, I R. 358; Tusks, III R. 2509, X Q. 266, 268.

earth are respectively capacity areas and constitute the two plates of a condenser, with the air between acting as a dielectric (i. e., an electrical insulator between the two plates). Marconi's condenser h and the antenna-earth capacity (another condenser) are thus sequentially in series in the circuit which includes the inductance coil g' . (See Figure 2, p. 9.) Since the size of Marconi's condenser h is given as .0046 microfarads in the Marconi specification¹² and the antenna-earth capacity is established as .00024 microfarads,¹³ the condenser h is so large with respect to the antenna-earth capacity that condenser h is almost like a continuous wire in this association. There is no dispute about this principle.¹⁴ Consequently, in the Marconi arrangement, tuning of the circuit is accomplished by the inductance g' and the antenna-earth capacity. (See Figure 2, p. 9, *supra*.)

¹² P. 4, col. 3, under "receiving station."

¹³ Wheeler, III R. 2437; Tuska, III R. 2509.

¹⁴ Plaintiff's experts Waterman, Tuska, and Pickard each brought this out. Thus Waterman testified (I R. 358):

"It is a curious fact which must be borne in mind in dealing with wireless telegraph circuits that for the purposes of the high-frequency oscillatory currents a large condenser acts almost like a continuous wire, and when placed in a circuit in a series or tandem relation with a small condenser it has very little effect."

Tuska similarly testified (III R. 2509, XQ. 266) that the Marconi condenser h

"is so large that it can be neglected. When one has a very large condenser connected in series with a very small condenser, you can neglect the larger one."

See also Pickard, III R. 2330, 2331, 2334.

Since those skilled in the art understand that the antenna-earth constitute a condenser,¹⁵ it is customary in diagrammatical drawings to omit symbolic representation of the capacity actually existing between the antenna and earth elements of the drawing. When this capacity is shown by symbol to aid its visualization, the complete antenna-circuit covered by claim 16, as shown in Marconi's Figure 2, is as shown on p. 19 (the dotted lines symbolizing the antenna-to-earth capacity):

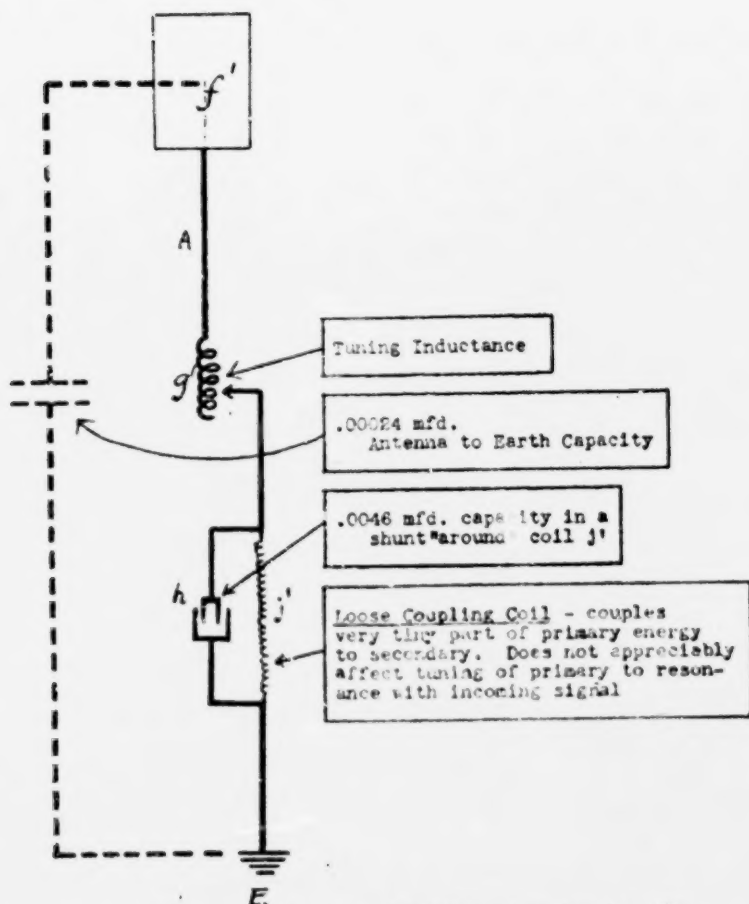
The tuned circuit, therefore, is the heavy line circuit g', A, f' via antenna-earth capacity to E , and condenser h . Since for reasons already stated the condenser h acts substantially as a continuous wire, the effect of coil j' on the tuning of the antenna circuit is negligible.¹⁶ Accordingly, the maximum wave length to which the tuned antenna circuit resonates is determined by the number of turns of inductance coil g' , the variable inductance which Marconi stated to be the essential element for tuning his circuit.¹⁷

Condenser h cannot lengthen this wave length. Increasing its capacity would be ineffective since it is already so large compared to the antenna-earth capacity that only the latter capacity functions. Reducing the value of h to less than the

¹⁵ This was recognized and explained by Lodge prior to the alleged Marconi improvement (Finding XXXVI, I R. 30).

¹⁶ Tuska, III R. 2509; Waterman, I R. 378 (cf. Fig. 2, p. 16, *supra*).

¹⁷ Marconi patent 763,772, p. 1, lines 50-59; Finding 19, I R. 136.



antenna-earth capacity would likewise be ineffective, for this would merely reduce the product of the capacity and inductance of the circuit, and so shorten the wave length.¹⁸

¹⁸ The wave length to which a circuit resonates is determined by the product of the total effective capacity and the total effective inductance in the circuit. The accepted formula, used by all the experts, is: Wave length, in meters = $1884 \sqrt{L \times C}$, where L is inductance in microhenries, and C is capacity in microfarads (Lavender, III R. 2520).

The real function of the condenser h as used by Marconi, is to effect a "loose coupling" between the two receiver circuits to improve sharpness of tuning. There are two paths for the current flowing from antenna to earth: the condenser h and the coil j' . By placing his condenser h in the shunt arrangement described, Marconi caused substantially all of the current of the antenna circuit to flow through the condenser h and only about two percent to flow through the coil j' . The energy of the antenna circuit thus distributed to the shunt condenser h was "bypassed" *around* the primary coupling coil j' and hence not coupled to the secondary coil j'' ; only the small part of the energy (2%) running through the transformer primary coil j' was coupled to the secondary coil j'' . By thus distributing only a small part of the energy to the transformer primary coil, the effect of one transformer circuit on the total energy of the other is reduced; that is, the coupling between the two circuits is made loose.¹⁹ This loose coupling between j' and j'' tends to give best results and sharpest tuning in Marconi's circuit. (See Findings XXXVIII, XXXIX; I R. 31, 32; II R.

¹⁹ Loftin, II R. 977, 1073; Wheeler, III R. 2434-2437, 2442-2443, 2446-2448; Waterman, I R. 357.

1018, 1019, 1073.)²⁰ As already stated, the coil j' being substantially bypassed,²¹ has as a practical matter no effect on the tuning of the primary circuit. The antenna circuit, as regards tuning, corresponds with Fig. 2, p. 16, *supra*.

(c) *The Government's Circuits*

In the Government's receivers the condenser, being differently connected (see figures, *supra*, p. 13), has an entirely different effect. Its capacity is added to the antenna-to-earth capacity and tends to increase the wave lengths. Moreover, it

²⁰ The energy could also be distributed and the coupling loosened either by relative physical movement of the transformer coils toward and from one another (Loftin Ex. M-2, Fig. 4) or by use of Stone's swamping inductances (*id.* Fig. 5). However, as pointed out by plaintiff's expert Waterman (I R. 373), the choice of these methods "is a mere matter of detail" in the combination. Marconi used his condenser h merely as another means of distributing the energy of the antenna circuit to effect loose coupling of the transformer circuits.

The trivial character of this feature of claim 16 is indicated by Waterman's testimony (I R. 357) that the "condenser h has no important or modifying effect on the general mode of operation" and by the unrebutted testimony of defendant's expert Loftin (II R. 977) that condenser h "is an arrangement rarely used in tuning the antenna or open circuit through varying the effect of the coil of the winding which it shunts," and is "merely one of the empirical methods employed by the art."

²¹ Tuska, III R. 2509, 2168; Wheeler, III R. 2434-5, 55 Q.

does not serve to effect any loose-coupling arrangement.

As will be seen from the diagram above at page 13, the condenser (h) in the Government's receivers does not constitute a bypass around the coupling coil (j'), but instead is in parallel with all the inductance coils (j' and g) in the circuits and is thereby in parallel with the antenna-earth capacity ($f-E$). The presence of the two capacities thus in parallel in the circuit which is in series with the inductance gives a total capacity equal to the *sum* of the two capacities (Figs. 3 and 4 *supra*, p. 16). The result is the same as would be obtained if a larger antenna or increased inductance were used, with the additional effect that the current in the tuning coils is enabled to build up to a value even greater than that in the antenna.²² In short, as the court below found after the accounting proceedings, the condenser in the Government's receivers enabled them to be tuned to longer wave lengths than would be the case with the ordinary series circuit and increased the sensitivity of reception (Findings 28, 29, and 45, I R. 143, 156).

—The court below made no finding that the Marconi circuit was designed for this purpose or achieved this result, and the pertinent testimony

²² This was known to the art prior to Marconi, as will be shown in Point II, pp. 24-31, *infra*.

was to the contrary.²³ The court simply found, in its interlocutory decision of November 5, 1935, that the Government's receivers had "apparatus coming within the terminology of claim 16" (Finding LXIII, I R. 60), and, in its final decision after the accounting proceedings, that the Government's condenser in the circuit employed "had the function and effect similar to that possessed by the adjustable condenser of the Marconi patent" (Finding 24, I R. 139) as to which it had made no specific finding.

The mere fact that the Government's arrangement falls within the literal language of claim 16 of course does not justify a finding of infringement;²⁴ and, as we have shown above, the "function and effect" of the two arrangements differ substantially. The court below failed to make any evidenciary findings of fact as to this very material issue. Had it made such findings, it would have been clear that the difference in arrangement, relative to the antenna-earth capacity and the tuning inductance, produces such a difference in mode of operation and result that no infringement can exist.

²³ Tuska, III R. 2509, XQQ. 266, 268; Loftin, Wheeler, Dow, II R. 977; III R. 2434 (Q. 55), 2477 (124 Q.), 2465 (255 XQ.), 2364, 2367; Waterman, I R. 357, 358.

²⁴ See cases *supra* n. 6. p. 10, especially *Westinghouse v. Boyden Power Brake Co.*, 170 U. S. 537.

POINT II

If the Government's receiver infringes claim 16, that claim is void for anticipation by the prior patents to Pupin and Fessenden

We have urged in Point I that the differences between the device disclosed in claim 16 and that in defendant's receivers are such as to preclude the conclusion that the latter infringed the former. If, however, we are mistaken in this, and claim 16 is broad enough to cover defendant's receivers, claim 16 is necessarily void because of prior patents.

The broad principles involved in tuning a receiver such as those of the Government involved in suit, were all known prior to Marconi. The evidence showed and the court below found that "the laws regarding the relationship of capacity and inductance to achieve the tuning of an alternating current circuit were known prior to Lodge" patent No. 609,154 (also in suit in the court below), which antedated the Marconi patent, and that Lodge taught the art to apply these laws to the so-called "open" antenna-circuit (Findings XXXVI, LXI; I R. 29-30, 57). The evidence also established and the court found that prior to Marconi's patent persons skilled in the art knew how to adjust the condensers shown in the earlier Stone patent No. 714,756 (Ex. Q-3) to achieve the

desired tuning, even though Stone's drawing did not show that his condensers were adjustable.²⁵

In addition to these general principles, the prior art contained the precise arrangement utilized in the Government's receivers. The Fessenden patent No. 706,735,²⁶ for which application was filed in 1899, prior to the earliest date proven for the Marconi invention, showed an adjustable condenser in shunt with all the inductance coils in the antenna-circuit of a wireless receiver; and the Pupin patent No. 640,516,²⁷ also prior to Marconi, not only showed a similar arrangement, but fully explained the laws governing its operation, which were known at the time of Fessenden's application (Findings XXXVI, LIII, I R. 29-30, 47). It is our position, therefore, that since the arrangement of the condenser in the Government's receivers is the same as that disclosed prior to Marconi, the Marconi claim 16, if construed to apply to the Government's arrangement, is anticipated by the prior patents to Pupin and Fessenden, and as so construed is, therefore, void.

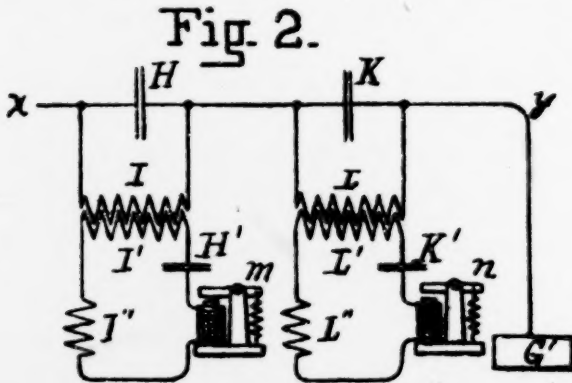
²⁵ Finding LIII, I R. 47-51; Finding XXVII, last sentence, I R. 24; Finding XLIII, 3rd paragraph, I R. 38-39; Finding LII, I R. 47.

²⁶ Ex. LL, same as Plaintiff's Ex. 171, p. 90-97, in record prior to interlocutory decision of November 4, 1905, IV R. 3039.

²⁷ Ex. KK, same as Ex. U-2, V R. 3595. The latter exhibit was referred to by the court below as showing prior knowledge of the laws of tuning (I R. 30), and as prior art relied on as anticipating Marconi (Finding LI, I R. 45, 46).

1. Pupin

Upon an application of May 28, 1895, Pupin received patent No. 640,516 on January 2, 1900 (Ex. KK, U2), prior to Marconi's earliest invention date.²⁸ Figure 2 of this patent is as follows:



This Pupin patent discloses a receiving system in which an open receiving circuit $x-G'$ connected to earth at G' is also connected to the primary coil I or L of an oscillation transformer, and to a condenser H or K in parallel with the primary coil. The secondary coil of the transformer (I' or L') is in circuit with a suitable detecting device m or n .

In his drawing, Pupin's receiving system receives its oscillating current not from wireless waves as in Marconi's patent, but from a telegraph wire transmitting the alternating current and connected at x . However, Pupin contemplated applying the same technique to receiving oscillations transmitted by other means, as his specification points out:

²⁸ Nov. 10, 1900, Finding XLI, I R. 37.

Where in the claims I specify the combination of a line-wire or a line with one or more resonant circuits * * *, I wish it to be distinctly understood that I do not limit myself to any specific means or method of transmitting from one station to another nor to any specific connection between the transmitting and receiving stations * * *. (Pupin patent, Def. Ex. U-2, p. 3, lines 64-73, V R. 3598.)

The immateriality of the mode of transmission, in this connection, is borne out by the fact that the effect upon Pupin's receiving apparatus is the same whether the oscillating current comes from the transmitter by wire or by way of electro-magnetic waves (Dow, III R. 2378-81; Loftin, II R. 938-941).

Pupin's patent explains (p. 1, lines 46-52) that if the circuit $H-I$ (or $K-L$) is tuned to the same periodicity^{28a} as the current in the wire $x-G'$ (which corresponds to the antenna circuit and has the earth connection G'), the current flowing in primary coil I (or L) will be greater than that in the rest of the circuit (p. 1, lines 10-14), and hence will transmit maximum energy to the secondary coil I' (or L') and in consequence to the operating coil of translating device m (or n). The Pupin specification (p. 1, lines 9-14) states:

^{28a} As representative of any "desired frequencies" or periodicity, Pupin suggested 150 cycles and 250 cycles per second (Ex. U-2, p. 2, lines 70, 74, 107, V R. 3597). Maxwell's Laws apply to the full range of Hertzian wave frequencies including those, as was known in 1894, cf. Brief for United States in No. 369, this Term, footnote 14 and text pp. 36-37.)

If a condenser be inserted in a line and a self-induction coil be connected in shunt with this condenser, then an alternating current impressed upon the line will under certain conditions be greater in the shunt-circuit than in the line itself.

The conditions under which this occurs are stated to be that—

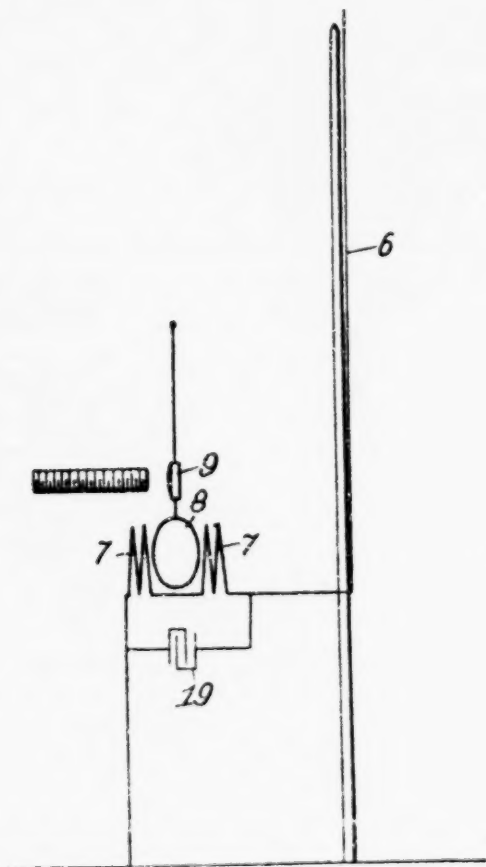
the capacity of the condenser and the self-induction of the shunt-coil must be so related as to bring the shunt-circuit in resonance with the line-current. (P. 1, lines 33-36.)

It is thus clear that Pupin uses the condenser *H* or *K* (in parallel with the capacity existing between the elevated wire *x* and the earth *G'*) across all the inductance coils *I* or *L* of the circuit to be tuned to resonance with the incoming oscillation, and builds up the current in this resonant circuit to increase the sensitivity of reception.

The same operation and effect characterize the Government's receivers. These receivers use the condenser *h* in parallel with the antenna-earth capacity across all the inductance coils of the primary circuit, so that the two capacities add to each other, thus increasing the wave length, and building up the current in the primary transformer coil to improve the sensitivity of the receiver (Pickard III R. 2334; *supra*, n. 22, p. 22). The Government's arrangement, mode of operation, and result, are thus the same as those of Pupin.

2. Fessenden

The Fessenden patent uses the same arrangement as Pupin in a wireless-wave receiver. Upon application filed December 15, 1899, also prior to Marconi's invention date, patent No. 706,735 was granted August 12, 1902, to Fessenden (Ex. 171, p. 93, IV R. 3039; Ex. CCCC (not printed)). Figure 1 of this patent disclosed the following radio receiver:



This Fessenden receiver comprised an oscillation transformer consisting of a primary coil 7

and a movable secondary coil 8; an open circuit (6 to earth) connected with coil 7, the circuit including an oscillation receiving conductor 6 at one end and capacity (earth) at the other end; a condenser 19 in a shunt connected with the open circuit and around said coil 7; and a wave-responsive device 9 connected with the other coil 8.

As originally filed, the Fessenden application claimed, described, and illustrated this entire arrangement, comprising the open antenna circuit 6, the primary of which included inductance coils 7 shunted by a condenser 19 (Def. Ex. CCCC²⁸⁶). By amendment the purpose of this disclosure was stated to be the obtaining of a current in the shunt circuit greater than that in the antenna load or line by tuning the shunt or wheel circuit to resonance with the signals being received (*id.*). This purpose was the same, and the principles of operation of the shunt circuit were the same, as those disclosed in the earlier Pupin patent. Like Pupin's condenser *H*, Fessenden's condenser 19 is placed in parallel with the capacity existing between the antenna wire and the earth, and is connected across *all* the inductance coils of the circuit being made to resonate with the incoming wave length. This increases the wave length of resonance compared to that obtainable if the condenser were omitted, and tends to increase the current in such coils. The arrangement disclosed

²⁸⁶ Not printed, see transcript.

and claimed, in light of the knowledge of the art, clearly suggested the amendment.^{28c}

In defendant's receivers, just as in the Fessenden patent, the condenser *h* is placed in parallel with the antenna-to-earth capacity and is connected across *all* the inductance coils of the antenna circuit so that the two capacities add, in effect constituting one larger capacity acting in series with such tuning coils. The arrangement, mode of operation, and results achieved are thus identical.

Because of the correspondence between the defendant's structures and those disclosed in the pre-Marconi patents of Fessenden and Pupin, claim 16 of the Marconi patent, if construed to include the Government's structures, would necessarily include the identical prior art devices and hence be invalid for anticipation.²⁹ If claim 16 is to be saved from anticipation, it must be construed as directed solely to Marconi's specifically disclosed arrangement (*supra*, p. 16) and thus as having an operation and result different from the arrangement common to Fessenden, Pupin, and the defendant.³⁰ Such interpretation of claim 16

^{28c} See authorities in Brief for United States in No. 369, this Term, footnotes 25 and 26 and text pp. 63-64.

²⁹ *Knapp v. Morse*, 150 U. S. 221; *American Fruit Growers, Inc. v. Brodus Co.*, 283 U. S. 1.

³⁰ As shown in Point I (pp. 16-21, *supra*), such construction is entirely reasonable, since there is at least substantial evidence to support a finding that Marconi's condenser *h* is arranged differently, operates differently, and produces a different effect.

to avoid invalidity would, as we have shown in Point I, exclude the defendant's receivers and require a decision of noninfringement.

POINT III

Evidence introduced at the accounting proceedings, bearing upon validity and infringement, should have been considered by the court below in rendering final judgment on those issues

In Points I and II, we have shown that there is no substantial evidence to support the conclusion of the court below that claim 16 was valid and infringed and, on the contrary, that the evidence required the opposite conclusion.³¹ To sustain our position we have treated the record as a unit and, accordingly, have cited pertinent portions not only of the hearing preceding the interlocutory judgment of November 4, 1935, but also of the hearing in the accounting proceedings which followed.³² The basic evidence as to the structure of the Government's device, and its identity with that disclosed by Pupin and Fessenden, was introduced at the first hearing. We believe that the court below by a mere comparison of the drawings in Fessenden and Pupin's patents, which were prior to Marconi, and the drawings of the Government's receivers—all of which were in evidence at the earlier hearing—should have found at the close of that hearing that Marconi's claim 16, if infringed, was invalid for anticipation. Moreover, the court

³¹ The record of the accounting proceedings begins at III R. 2313.

below made no evidentiary findings of fact whatever directed towards the criteria of infringement, to support its ultimate finding that there was infringement.³² It is our position, therefore, that the record of the hearings preceding the interlocutory judgment alone requires the conclusion that claim 16 was not infringed, or if infringed, was not valid.

If we are mistaken in our contention that this conclusion can rest upon the earlier record standing by itself, it plainly is required by the entire record. And we submit that, in the circumstances of this case, the evidence which was required to determine the accounting issue may be, and should have been, considered by the court below upon the questions of validity and infringement. Since the question of the propriety of considering the evidence in the accounting proceeding turns upon the peculiarities of the development of this case, we shall first describe the course of events giving rise to the procedural problem.

The parties had stipulated that the first hearing be limited to the issues of validity and infringe-

³² This alone would warrant reversal of the judgment under Section 3 (b) of the Act of February 13, 1925, as amended (see Appendix, p. 51, *infra*). Even before the amendment of May 22, 1939, § 3 (b) of the 1925 Act authorized this Court to "review, in addition to other questions of law, errors assigned to the effect that an ultimate finding or findings are not sustained by the findings of evidentiary or primary facts; or that there is a failure to make any finding of fact on a material issue."

ment, pursuant to Rule 39 of the Court of Claims which provides:

In any patent suit it shall be competent for the parties to stipulate that the hearing in the first instance be limited to the issues of validity and infringement and when no such stipulation can be reached by the parties the court may order such procedure to be followed.

If the patent is held valid and infringed by the United States the court shall so adjudge and the case shall thereafter proceed according to law.

At the first hearing, the operation and result of claim 16 were not brought out by either party, since both parties were proceeding on the assumption—plainly evident from the course of the hearing and the questions propounded to the expert witnesses—that claim 16 would stand or fall with the other six claims covering the receiver which the court below held to be invalid for anticipation. Claim 16 was a relatively minor aspect of these seven receiver claims, and was not given particular emphasis by either side (see n. 20, p. 21, *supra*) until the interlocutory judgment held that it alone out of the fifteen Marconi claims was valid and infringed. At the accounting, of course, both parties gave much more detailed attention to claim 16 and to the arrangement in the Govern-

ment's receivers alleged to infringe, as well as to similar devices in the prior art.²³

After the first hearing, the court below rendered a judgment on November 4, 1935, holding claim 16 of the Marconi patent valid and infringed, but expressly reserving final judgment "until the amount of reasonable compensation for damages or profits is determined in accordance with the stipulation of the parties" (1 R. 75).

The court below made findings of fact, but made no findings, either evidentiary or ultimate, concerning the mode of operation and results of Marconi's and the Government's arrangement to support its conclusion of infringement. And upon the assumption that this was due to the absence of evidence upon which such findings could be made, the conclusion as to infringement can be justified only as a preliminary or interlocutory determination prior to the accounting proceeding, and subject to reconsideration upon the final judgment after a full development of the evidence of infringement.

At the accounting proceedings, in order to establish the amount of compensation to which

²³ The Commissioner of the Court of Claims who reported proposed findings of fact to the court at the conclusion of the first hearing, specifically mentioned the absence of evidence in the record as to the mode of operation and result of the condenser described in Claim 16. *Record Ct. Cl.* No. 33,642, Proposed Finding of Fact LXII, June 26, 1933, p. 2216.

the plaintiff was entitled, plaintiff adduced evidence to show the advantages derived by the Government from its alleged use of the device disclosed in claim 16. In order to establish a basis for a proper apportionment of value, evidence was then introduced by the Government to show that the proven advantages were derived not from the Marconi arrangement but from the Fessenden and Pupin prior art disclosures. These advantages necessarily inhered in the mode of operation and the results attained by the devices involved, and to justify their inclusion in the award, their attribution to the Marconi claim was of course requisite. Consequently, evidence was fully developed at the accounting proceedings showing the actual operation and effect of the condenser arrangements disclosed by Marconi, and Pupin and Fessenden, and of that which was employed in the Government's receivers.

At the close of the accounting proceedings, and upon the basis of the entire record, the Government requested the court to make numerous evidentiary findings of fact as to the mode of operation of the Marconi and the Government's devices and of the devices disclosed by Pupin and Fessenden,³⁴ and also requested the ultimate finding that—

³⁴ Defendant's exceptions to the commissioner's report on the accounting (Record in C. Cls. No. 33642, pp. 4719-4799).

the mode of connecting the primary condenser in parallel with the antenna-to-earth capacity used by the defendant followed the disclosure of [Pupin and Fessenden], and hence does not infringe the Marconi claim 16 which is based upon a different arrangement, operating in a different manner to obtain a different result.³²

The court, however, declined to make any additional findings on the issues of validity and infringement, holding that the—

question of infringement of Marconi claim 16 by the apparatus designated in Finding LXIII of the prior decision is not before us in the present accounting. In order to forestall further controversy, however, we have found validity and infringement as an ultimate fact (Findings 1 and 23) in our special findings of fact. (I R. 176.)

The court further stated in its opinion that its original decision “established the scope of claim 16 when it held the same infringed,” and that the

sole purpose and function of an accounting in a patent infringement case is to ascertain the amount of compensation due, and no other issue can be brought into the accounting to change or alter the court’s prior decision. (I R. 177.)

In failing to make the requisite evidentiary findings of fact to support its conclusions as to

³² Record in C. Cls. No. 33642, p. 4799.

validity and infringement, and in declining to consider the evidence adduced at the accounting proceeding bearing upon these issues, we believe the court below was in error. The judgment of November 4, 1935, was interlocutory in nature, the court below having expressly reserved final judgment until after the accounting I R. 75; consequently, the court had full power to modify it in order to accord with the entire record at the close of the proceedings. A decree holding a patent to be valid and infringed and ordering an accounting proceeding before a master is not a final decree, but merely interlocutory, even though accompanied by a permanent injunction. *John Simmons Co. v. Grier Bros. Co.*, 258 U. S. 82; see *McGourkey v. Toledo & O. C. Ry.*, 146 U. S. 536, 545.³⁶ Consequently, the court may modify such a decree after the accounting proceedings, in rendering final

³⁶ While there was originally no right to appeal from an interlocutory decree of a federal court holding a patent valid and infringed and referring the matter to a master for an accounting (*Barnard v. Gibson*, 7 How. 649; *Huminston v. Stainthorpe*, 2 Wall. 106), the Act of March 3, 1911, as amended (28 U. S. C. § 227a), now permits appeals from such decrees. Similarly, an interlocutory judgment of validity and infringement by the Court of Claims is reviewable prior to the accounting proceedings on a writ of certiorari from this Court. *United States v. Esnault-Pelterie*, 299 U. S. 201; 303 U. S. 26. But review at this stage is permissive only; and defendant may wait until final judgment, as in the case at hand. This also holds true in the district courts. *Bingham Pump Co. v. Edwards*, 118 F. (2d) 338 (C. C. A. 9).

judgment. *Bingham Pump Co. v. Edwards*, 118 F. (2d) 338 (C. C. A. 9); see *John Simmons Co. v. Grier Bros. Co.*, 258 U. S. 82, 88, 89; *Individual Drinking Cup Co. v. Errett*, 297 Fed. 733, 741 (C. C. A. 2); *David Bradley Manuf'g Co. v. Eagle Manuf'g Co.*, 57 Fed. 980, 985 (C. C. A. 7), certiorari denied 154 U. S. 500; *Bassick Mfg. Co. v. Larkin Automotive Parts Co.*, 23 F. (2d) 92 (D. C. N. D. Ill.); cf. *McGourkey v. Toledo & O. C. Ry.*, 146 U. S. 536 (mortgage foreclosure); *Perkins v. Fourniquet*, 6 How. 206, 208 (distribution of property to heirs).

The reason and policy underlying these principles make them as fully applicable to a patent proceeding in the Court of Claims where an accounting involving such judicial questions as apportionment and evaluation follows a preliminary determination as to validity and infringement, and requires further proceedings in the Court of Claims upon such questions. Cf. *McGourkey v. Toledo & O. C. Ry.*, 146 U. S. 536, 545. Since the Court of Claims retained power to modify its preliminary determination as to validity and infringement, and since the record before the court on the accounting clearly contained evidence requiring a finding of noninfringement (i. e., differences in mode of operation and result), the court below erred in considering itself bound by its initial and preliminary judgment as to validity and infringement.

This conclusion is not inconsistent with the conceded general rule that the court's power to modify

an interlocutory conclusion does not justify the master or commissioner in admitting, in the accounting proceedings, evidence designed *solely* to attack the court's interlocutory holding of validity and infringement. *Flat Slab Patents Co. v. Turner*, 285 Fed. 256 (C. C. A. 8), certiorari denied 262 U. S. 752. For the very existence of the power to modify assumes that evidence or other matter bearing upon the validity of the interlocutory order may subsequently come to the court's attention and justify modification of that order. *Cf. John Simmons Co. v. Grier Bros. Co.*, 258 U. S. 82; *Bingham Pump Co. v. Edwards*, 118 F. (2d) 338 (C. C. A. 9). This case squarely presents the occasion for the exercise of that power, because the very issues left for ultimate judicial determination after the interlocutory judgment required the consideration of evidence which demonstrated the error in the earlier conclusion.

POINT IV

The Court of Claims erroneously adopted as a basis of compensation advantages attained by the Government's receivers, but not attainable by Marconi's device

After its interlocutory judgment of November 4, 1935, holding claim 16 valid and infringed, the court below ordered an accounting proceeding to be held before a Commissioner, in order to determine the "reasonable and entire compensation" to which the plaintiff was entitled under the Act of June 25, 1910, as amended (I R. 75; see Appendix, pp. 51, 52). In the accounting pro-

ceeding, the Commissioner found it necessary to employ, as the basis for compensation, the value of the advantages contributed to the Government structures by the subject matter of Marconi claim 16, measured for the most part by the cost of obtaining such advantages through alternative constructions. The court below adopted this basis (I R. 180-181). It thus became necessary first to determine what advantages were derived from the Marconi contribution, as distinguished from the contributions of others.

Plaintiff proved, and the court correctly found (Findings 29, 30; I R. 143-144), that *defendant's* arrangement of the condenser in its circuit (1) increased the wavelength range of the receiver; (2) saved the space and weight of additional loading coils; and (3) increased the current in the primary coil of the oscillation transformer, thus improving sensitivity. Plaintiff made no effort to show that the arrangement disclosed by Marconi's patent had any of these advantages. Defendant then introduced evidence showing that the condenser arrangement disclosed by Marconi had none of these advantages;³⁷ and that on the

³⁷ Marconi's arrangement of the condenser, as explained above in detail, put it in series with the antenna-to-earth capacity where it could not operate to increase the wavelength range of the receiver. Marconi actually increased his wavelength range by using additional loading coil g' (see n. 39, p. 47, *infra*, and compare tunes 3 and 4 in the table on page 4 of the Marconi patent) and thus did not save the space and weight of these additional coils. Again, in Mar-

contrary the advantages of the Government's condenser arrangement were those realized in the same way in Fessenden's and Pupin's prior inventions.³⁸

Defendant requested, both before the Commissioner and the court below, that evidentiary findings be made not only as to the advantages of the Government's condenser arrangement, but also as to whether the advantages were achieved by the arrangement disclosed by Marconi, or by the earlier arrangements of Pupin and Fessenden, as a basis for determining which of the proven advantages, if any, of defendant's structure had been derived from the Marconi disclosure. The defendant further asserted, before both Commissioner and court, that none of the proven advantages of defendant's arrangement was derived from the Marconi disclosure; hence, that even if claim 16 was valid and infringed, plaintiff was

coni's arrangement the condenser did not operate to increase the current in the primary coil of the oscillation transformer, but on the contrary operated to reduce it to only about 2% of what it would have been in a straight series connection. (See pp. 20, 21, *supra*.)

³⁸ The Pupin and Fessenden patents concerned were in evidence prior to the court's interlocutory decision of November 4, 1935 (Def. Ex. U-2; Pl. Ex. 171, p. 98, *et. seq.*). These patents were prior to Marconi in point of time and disclosed the feature of defendant's arrangement alleged to infringe claim 16. Hence, as shown in Point II (pp. 24-39, *supra*), Pupin and Fessenden anticipate and invalidate the claim if it applies to defendant's arrangement.

entitled to nominal damages only (see n. 34, p. 36, *supra*).

The court below made evidentiary findings of fact as to the mode of operation and advantages of the defendant's structure, but refused to consider or make findings based on evidence adduced by the Government explaining the functions of the condenser in the Marconi arrangement and showing that the advantages of the Government's device were not contributed by the Marconi disclosure. Instead, the court used the advantages achieved by the Government's arrangement as the basis for compensation, without finding that Marconi's arrangement contributed such advantages (I R. 175-178).

It measured the value of the increased wavelength range by the cost of the additional inductance coils which would have been necessary to attain that advantage without employing the Government's condenser arrangement, and found that the cost of such additional coils would have been \$56,113.17. It further found that the other minor advantages attained by the Government's arrangement of the condenser (increased sensitivity and the saving in space and weight resulting from eliminating the necessity of such extra coils) were worth \$2.50 per receiver, or a total of \$10,017.50. Of the total amount of \$66,130.67 taken to represent the advantages of defendant's arrangement,

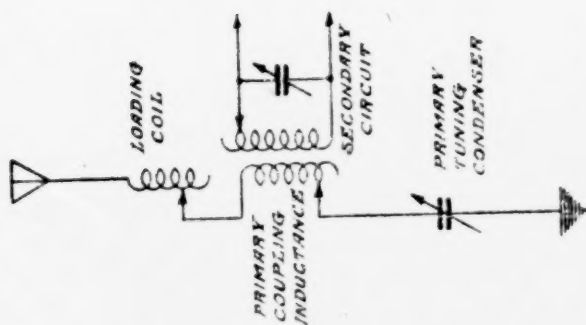
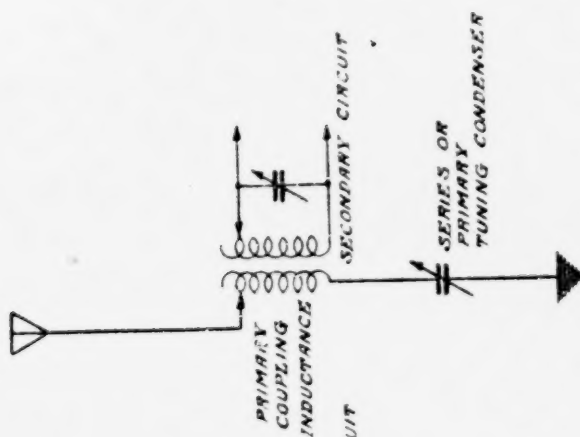
the court below allowed the plaintiff 65%, or \$42,984.93 with interest thereon, advancing no explanation for the percentage selected (1 R. 151-157).

We submit that in the absence of any finding—or of any evidence which would support a finding—that the evaluated advantages were contributed by plaintiff's patent, the ruling of the court below as to compensation was in error.

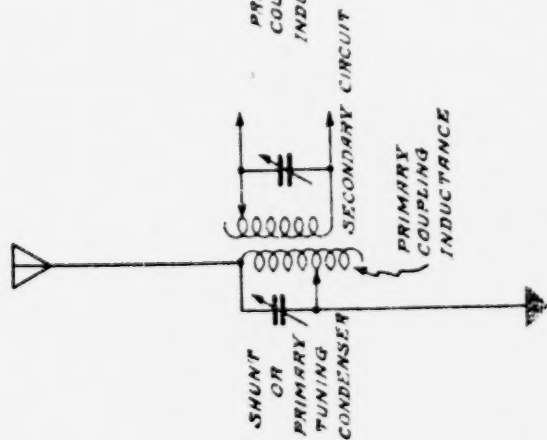
1. The court made findings as to the advantages of defendant's device only

In its final findings of fact, the court below explained (Finding 27, 1 R. 141-142) by means of diagrams reproduced hereafter, that with the inductance and capacity of the circuit in series with the antenna-earth capacity (middle diagram), regardless of the maximum value of the condenser, no longer wave length can be received than could be received without the condenser; and that the wave-length range can be increased by adding more inductance, as by a loading coil (right diagram), as well as by a shunt-connected condenser bridging all the inductance coils in the circuit (left diagram, called "Parallel Connection"):

But the parallel connection shown is not the arrangement of the Marconi circuit, for it omits Marconi's adjustable inductance g' between the

SERIES CONNECTION
WITH LOADING COIL

SERIES CONNECTION



PARALLEL CONNECTION

condenser and the antenna which Marconi claimed as part of the "means for adjusting the two transformer-circuits in electrical resonance with each other," and which he stated to be "essential" (see note 7, p. 12, *supra*, and Fig. 2 of Marconi patent, page 9, *supra*). The shunt-connected condenser shown in the court's diagram is rather that of the Government's circuit, which differs in arrangement, operation, and result from that of Marconi, as shown in points I and II (pp. 12-31, *supra*).

The court below properly found that the condenser *h* in the defendant's receivers "enables the primary circuit to be tuned to the relatively longer wavelengths" when the condenser is shifted to the so-called "parallel connection" (Finding 28, I R. 143). But there is no finding nor any indication in the court's opinion that any connection of the Marconi condenser *h* "enables the primary circuit to be tuned to the relatively longer wavelengths."

The court properly attributed to defendant's arrangement the other and minor advantages of saving in space and weight and increase in sensitivity, resulting from attaining longer wavelength without additional loading coils (Findings 29, 30; I R. 143-4). But here again there is no finding, nor any indication in the court's opinion, that the arrangement of the condenser disclosed by Marconi accomplished these advantages.

2. The record shows that the advantages found for defendant's arrangement were not contributed by Marconi

As shown just above, all the advantages found for defendant's arrangement of the condenser were based on the fact that defendant's arrangement enabled longer wavelengths to be attained without the use of additional loading coils, and hence without the added cost and disadvantages of such coils; but the court made no finding that the arrangement necessary to attain these advantages was disclosed in the Marconi patent.

As shown in Point I (*supra*, pp. 12-23), Marconi arranged his condenser *h* (upon which claim 16 is based) in such a manner that it did not and could not operate to increase the wavelength, or to eliminate the necessity for additional loading coils to increase the wavelength. Indeed, when he used that condenser arrangement, he relied entirely on additional load coils to increase the wavelength.³⁹

It is thus clear that Marconi's arrangement of the condenser did not attain the major advantage

³⁹ It will be seen from the table on page 4 of the Marconi patent that when Marconi desired to increase the wavelength of resonance of the circuit employing the condenser *h* (tunes 3 and 4) he added more loading coils *g'* (tune 4) than were used in tune 3. He did not eliminate their use. Marconi did not change the adjustment of his condenser *h* when he changed from tune 3 to tune 4 in the table on page 4 of his patent, and indeed to have done so could only have decreased the wavelength, as his condenser *h* was arranged to operate in series with the antenna-to-earth capacity. (See Point I, *supra*, p. 12-21.)

of an increased wavelength, nor the other advantages dependent on elimination of additional loading coils.⁴⁰ It follows that the advantages found for defendant's arrangement were not contributed by the Marconi disclosure.

3. The advantages of the defendant's arrangement were contributed by the earlier Pupin and Fessenden disclosures

The record shows that the advantages found to inhere in the Government's arrangement, far from being derived from Marconi, were in fact attributable to the disclosures of Pupin and Fessenden, which were prior to Marconi.

The court below found that after Lodge's disclosure, those skilled in the art were informed that the laws of resonance set forth in Pupin's patent were applicable to the so-called open antenna-circuits of wireless apparatus.⁴¹ And as shown in Point II, above, the Pupin patent and the patent to Fessenden both showed, prior to Marconi's patent, the arrangement of the condenser in parallel with the antenna-to-earth capacity, as it was employed by defendant. This arrangement, by the laws of resonance known prior to Marconi's contribution,⁴² caused the condenser capacity to be

⁴⁰ Moreover, as shown under Point I, Marconi's arrangement served to decrease the current in the coupling coil j' as compared to that in the antenna, and not to increase the current in the coil, as did defendant's arrangement (p. 20, *supra*).

⁴¹ Finding XXXVI, I R. 29-30. Indeed, the Pupin patent itself had so indicated (see quotation from Pupin patent, p. 27, *supra*).

⁴² Finding XXXVI, I R. 29-30.

added to the antenna-to-earth capacity, thus (as compared to a circuit having no such condenser) both increasing the wave length and increasing the current in the primary coil of the transformer, all without the necessity of additional loading coils.

Since these earlier patents contributed the advantages found by the court below, and did so by the same means as were used by defendant, these advantages could not have been contributed by Marconi's disclosure, as they had already been disclosed to the art.

4. The court below contravened settled rules of law governing apportionment in patent accounting

It is settled that a plaintiff in infringement is entitled to recover from the defendant only the value contributed by his patented device. *Dowagiac Mfg. Co. v. Minneapolis Moline Plow Co.*, 235 U. S. 641; *Westinghouse Co. v. Wagner Co.*, 225 U. S. 604, 615; cf. *Sheldon v. Metro-Goldwyn Pictures Corp.*, 309 U. S. 390; *Mason v. Graham*, 23 Wall. 261, 277; *Egry Register Co. v. Standard Register Co.*, 23 F. (2d) 438 (C. C. A. 6).

As we have shown, the advantages of longer wavelength range and greater sensitivity in the Government's receivers, insofar as derived from the condenser arrangement in question, were contributed not by Marconi's disclosure upon which claim 16 is based, but exclusively by Pupin, Fessenden, and the Government. Since it had no part in creating these advantages, Marconi's patent can furnish no basis for any participation in

their value. In holding otherwise, the court below contravened the settled rules of accounting in infringement proceedings.

CONCLUSION

For the foregoing reasons the judgment of the Court of Claims with respect to claim 16 of the Marconi patent 763,772 should be reversed.

Respectfully submitted,

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FEBRUARY 1943.

APPENDIX

The Act of June 25, 1910, c. 423, 36 Stat. 851 (35 U. S. C. § 68), provided:

That whenever an invention described in and covered by a patent of the United States shall hereafter be used by the United States without license of the owner thereof or lawful right to use the same, such owner may recover reasonable compensation for such use by suit in the Court of Claims: * * * *Provided further*, That in any such suit the United States may avail itself of any and all defenses, general or special, which might be pleaded by a defendant in an action for infringement, as set forth in Title Sixty of the Revised Statutes, or otherwise * * *.

This was amended by the Act of July 1, 1918, c. 114, 40 Stat. 704, to read as follows:

That whenever an invention described in and covered by a patent of the United States shall hereafter be used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, such owner's remedy shall be by suit against the United States in the Court of Claims for the recovery of his reasonable and entire compensation for such use and manufacture: * * * *Provided further*, That in any such suit the United States may avail itself of any and all defenses, general or special, that might be pleaded by a defend-

ant in an action for infringement, as set forth in title sixty of the Revised Statutes, or otherwise * * *

Section 3 of the Act of February 13, 1925, c. 229, 43 Stat. 936, 939, as amended by the Act of May 22, 1939, c. 140, 53 Stat. 752 (28 U. S. C. § 288*b*), provides:

(b) In any case in the Court of Claims, including those begun under section 180 of the Judicial Code, it shall be competent for the Supreme Court, upon the petition of either party, whether Government or claimant, to require, by certiorari, that the cause be certified to it for review and determination of all errors assigned, with the same power and authority, and with like effect, as if the cause had been brought there by appeal. In such event, the Court of Claims shall include in the papers certified by it the findings of fact, the conclusions of law, and the judgment or decree, as well as such other parts of the record as are material to the errors assigned, to be settled by the Court.

The Court of Claims shall promulgate rules to govern the preparation of such record in accordance with the provisions of this section.

In such cases the Supreme Court shall have authority to review, in addition to other questions of law, errors assigned to the effect that there is a lack of substantial evidence to sustain a finding of fact; that an ultimate finding or findings are not sustained by the findings of evidentiary or primary facts; or that there is a failure to make any finding of fact on a material issue.